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ND BEVERAGES

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1868 ①

Mashing.

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RECORDED

A.D. 1868, *29th July.* N° 2375.

Treating Saccharine Solutions.

LETTERS PATENT to Edward Herring, of 22, Beer Lane, in the City of London, Consulting Brewer, for the Invention of "IMPROVEMENTS IN THE TREATMENT OF SACCHARINE SOLUTIONS OF MALT OR SUGAR."

Sealed the 22nd December 1868, and dated the 29th July 1868.

PROVISIONAL SPECIFICATION left by the said Edward Herring at the Office of the Commissioners of Patents, with his Petition, on the 29th July 1868.

I, EDWARD HERRING, of 22, Beer Lane, in the City of London, Consulting Brewer, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN THE TREATMENT OF SACCHARINE SOLUTIONS OF MALT OR SUGAR," to be as follows:—

The object of my Invention is the conversion of saccharine solutions of any kind combined or separately into grape sugar, and the precipitation of the albuminous and nitrogeneous matters held in solution during, before, or after fermentation. I mash the malt, or sugar, or malt and sugar combined, or I treat the saccharine solution when reduced to about 54° or more Fahrenheit during, or before, or after attenuation with sulphuric or other acid, converting the whole of the saccharine into grape sugar. I neutralize a portion of the acid by lime or carbonate of lime to form a sulphate of lime in the exact quantity that exists in the Burton water, the remaining portion I neutralize by barytes, or lime, or other carbonate or caustic alkali.

The minor operations are continued as usual, but when the gyle is run into a "settling back," I add to it a gelatinous matter, preferably the material known as Baylis Childs' soluble isinglass, which precipitates all barm together with albuminous and nitrogeneous matters, and in about 12 hours I rack off "brilliant" into barrels.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Edward Herring in the Great Seal Patent Office, on the 23rd December 1868.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, EDWARD HERRING, of 22, Beer Lane, in the City of London, Consulting Brewer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-ninth day of July, in the year of our Lord One thousand eight hundred and sixty-eight, in the thirty-second year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Edward Herring, Her special licence that I, the said Edward Herring, my executors, administrators, and assigns, or such others as I, the said Edward Herring, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN THE TREATMENT OF SACCHARINE SOLUTIONS OF MALT OR SUGAR," upon the condition (amongst others) that I, the said Edward Herring, my executors or administrators, by an instrument in writing, under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Edward Herring, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement (that is to say) :—

The object of my Invention is the conversion of saccharine solutions of any kind that are suitable combined or separately into grape sugar, and the precipitation of the albuminous and nitrogenous matters held in solution during, before, or after fermentation. The sugars and sugar solutions that I have found to be suitable for being operated upon by my improved process as herein-after described are those made from cane, or beetroot, or maple, or grain. Heretofore the sugar contained in such solutions has been converted into grape sugar by treating them with comparatively small proportions of sulphuric acid compared with the larger proportions used by me, and it has been hitherto thought necessary to employ heat and mechanical agitation, which my improved method of operation enables me to dispense with.

By my Invention I treat saccharine solutions such as are above mentioned by a new and improved process, which effects the required conversion without the necessity of applying heat or of employing mechanical agitation, and produces grape sugar suitable for use in the processes of brewing, distilling wine, vinegar, and confectionery making.

My improved process may be applied to saccharine solutions obtained directly from the cane or from the root, or from wood containing sugar, or it may be applied to solutions of ordinarily manufactured sugar, or in some cases to the anylaceous and saccharine elements contained in raw materials or in malt, the result in each case being in each case the production of grape sugar as the result of the conversion effected.

I will now proceed to describe the manner in which I carry into effect my improved process. It may be convenient to describe first my mode of treating the saccharine solutions of the raw sugar producing substances obtained from cane, or beetroot, or maple wood. I put into a converting vessel such a quantity of sugar cane, beetroot, or maple tree in a dried and coarsely powdered state, or the fresh and green sugar cane, fresh beetroot, or maple tree in a crushed state as shall contain 185 to 195 lbs. of dry saccharum which is about equivalent to the quantity of saccharine matter usually contained in a quarter of malt; I then add water which is acidulated by mixing 4 lbs. of commercial sulphuric acid of about specific gravity of ·1843 previously diluted with 2 gallons of water, the temperature being about 50° degrees Fahrenheit, with or without ½ lb. of solution of bisulphite of lime, and the acidulated water being added in successive portions so as to exhaust and dissolve the sugar contained in the various substances, and ultimately to obtain about 72 gallons of saccharine solution. In cases where it is more convenient I put into the converting vessel molasses, or refiners' sugar called bastards, equal to about 185 or 195 lbs. of raw sugar, or that quantity of raw sugar itself to form the solution, and proceed as above described. The saccharine solution so acidulated is then allowed to remain 2 or 3 days, during which time the conversion into grape sugar is effected without application of heat and without mechanical agitation. The converted solution of sugar is then neutralized by adding about 6 lbs. or 8 lbs. of carbonate of lime, commonly called whiting, previously mixed with four gallons of hot water so as to form a creamy mixture, which is passed through a hair sieve to avoid lumps, if not sufficiently neutralized more whiting, or carbonate of lime, or caustic lime, or carbonate of barytes, or carbonated or caustic alkalies, or other neutralizing agent may be added until thorough neutralization is effected. The mixture is then filtered in order to separate the sulphate of lime and other impurities which are formed or thrown down during the process. To the filtered mixture albumen of blood or white of egg is to be added, according to the practice of sugar refiners. The solution of grape sugar is now to be tested by litmus paper, and if traces of acid be found a small quantity of milk of lime or caustic alkali or other neutralizing agent must be added to complete the neutralization. The process is then completed in the same way as in the ordinary process of sugar refining. In some cases the operation may be conducted without separating the sulphate of lime or other agent used to neutralize the acidulated solution above mentioned. In that case water is added in such quantity that about 54 gallons of saccharine solution instead of seventy-two gallons as above mentioned may be operated upon. The solution in that case is evaporated without filtering it so as to produce a mass which I term "Herring's Burton grape sugar," which may be advantageously used by brewers, as by reason of the presence of sulphate of lime it approximates to the constituents of of Burton water.

In conducting the process as part of the process of brewing, distilling, or wine making I proceed as follows:—I obtain a saccharine solution and effect the conversion into grape sugar in the manner before described. On the morning of mashing malt and while the malt is in the mash tun previously to setting tap the requisite quantity of the acidulated saccharine solution containing the converted grape sugar is run by four portions into the neutralizing under back (placed immediately under the converting under back) by pulling up a long wooden plug placed in a lead pipe. It is advisable to neutralize only ¼th of the converted grape sugar at each operation to guard against effervescing over when the neutralizing takes place. Having run 1 quarter of the converted grape sugar solution into the neutralizing back, I add one and a half to two pounds of carbonate of lime in the form of whiting previously mixed into a cream with one gallon of hot water and passed through a hair sieve to avoid lumps. In a very short time this first quarter of the grape sugar worts will be neutralized, I then add also dried white of egg or albumen (previously dissolved over night in cold water and well whisked in the morning). The solution of grape sugar is tested by litmus paper, and if found still acid a small quantity of milk of lime, carbonate of barytes, or other caustic or carbonate alkali must be added to complete the neutralization. The whole of this first quarter of the solution or wort of grape sugar with the whiting, white of egg, and now formed sulphate of lime, and other deposits is then run into the under back of the mash tun at the time of "setting tap" and during the running of the malt. The second quarter of the grape sugar is treated in the same way, and again the third quarter while the malt tap is running, and again the remaining quarter which will use up the whole of the solution of grape sugar, washing out the converting under back, and neutralizing under back with 6 gallons of water, reserving in all cases this last quarter of the grape sugar, and whiting, white of egg, and the now formed sulphate of lime, and other deposits and washings for the last malt worts, if two mashes of the malt are made. The grape sugar worts together with the sulphate of lime and neutralizing agents, &c., and malt mashes are boiled with the hops and run into the hop back, wherein the deposit of the sulphate of lime and albuminous matter takes place. The liquid is then cooled and attenuated in the ordinary way, using however a rather larger amount of barm than usual, and attenuating lower than usual. When the attenuation is completed the beer is to be run into a settling back and gelatinous matter, by preference Baylis Childs' solid or precipitate soluble isinglass is to be added in the proportion of one quart to every barrel of beer and well mixed; a sample of the beer should now be drawn in a glass, and if not inclined to separate and become brilliant, more soluble isinglass must be added, but if perfectly attenuated this further addition of soluble isinglass will not be necessary. In about 12 hours the beer may be racked off brilliant into barrels.

In treating saccharine solutions obtained from the anylaceous and saccharine elements contained in raw materials or in malt I proceed as follows:—The raw grain, or mixture of raw grain and malt, or the malt if used alone, is mashed in the mash tun in the way known to brewers and distillers; the tap is "set" in the usual way after the mashed mixture has stood for about one and a half hours to two hours, and the worts are run into the ordinary under back in the usual way. The worts produced I treat in the following manner:—I pump the worts into the converting under back, and add sulphuric acid and bisulphite of lime in the proportions of about four pounds of acid and half a pound of bisulphite of lime to such quantity of worts as would contain 185 to 195 lbs. of saccharine matter, that quantity being usually found in about one quarter of malt. The acidulated worts stand for two or three days in the converting vessel, during which time the conversion of the acidulated saccharum contained in the worts is effected; I then neutralize by whiting and other neutralizing agents, and when the neutralization is complete, but without separating the sulphate of lime, I proceed in the usual way known to brewers without further treatment, viz^{t}., by boiling with the hops and cooling and fermenting the worts in the usual way. Though in practically conducting this mode of applying my process the worts would necessarily be in the first instance in a heated state, the presence of heat is not necessary to the formation of grape sugar. The acidulated worts may be allowed to become cold and there is no application of heat during the time when the conversion is going on.

In treating saccharine solutions for the purpose of obtaining a solid grape sugar for the use of confectionery makers, the quantities of the materials (videlicit, the sugar and sulphuric acid) operated upon, but not the proportions above mentioned, will necessarily be varied.

Having now described the nature of my Invention, and the manner in which the same is performed, I wish it to be understood that I do not claim as new the use of sulphuric acid or bisulphite of lime generally or otherwise than substantially in the proportion and in the manner herein specified; what I claim is, my improved process of treating saccharine solutions and converting the sugar they contain into grape sugar by the agency of sulphuric acid applied in the proportions and manner herein described so as to enable the employment of heat and mechanical agitation to be dispensed with, the resulting product being what I call "Herring's grape sugar" or "Herring's Burton grape sugar."

In witness whereof, I, the said Edward Herring, have hereunto set my hand and seal, this Eighth day of December, in the year of our Lord One thousand eight hundred and sixty-eight.

EDWARD HERRING. (L.S.)

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